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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/612,848

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EXAMINER

RODRIGUEZ, ARMANDO

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,848

Applicant(s)

BISWAS ET AL.

Examiner

ARMANDO RODRIGUEZ

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-9,11 and 12 is/are rejected.
- 7) ☒ Claim(s) 3-6 and 10 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It was not executed in accordance with either 37 CFR 1.66 or 1.68.

The oath or declaration is missing an inventor's signature, see 37 CFR 1.63.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the single switch and single high voltage d-c source of claim 2 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

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As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Objections

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 12 and 13 have been renumbered as 11 and 12, respectively.

Claim 11 is objected to because of the following informalities: claim 11 should make reference to the volume in terms of a range. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (PN 5,293,390) in view of Kyusho (PN 4,802,185), Cirkel et al (PN 4,365,337) and Leland et al (PN 4,264,868).

Claim 1,

1. A helium-free TEA CO₂ laser comprising:

a pulser, a laser head comprising a pair of electrodes, a gaseous medium comprising a mixture of CO₂, N₂ and, optionally, H₂, adapted to be preconditioned/pre-ionised in the inter-electrode volume by a suitable means; said pulser comprising an excitation circuit comprising (i) means to isolate spiker and sustainer pulses and (ii) means to delay the spiker pulse with respect to the pre-ionising pulse.

Regarding claim 1,

Furuya et al illustrates in figure 1 a gas laser (10) having an electric circuit [applicant's pulser] formed by the terminal (14), switch (17), capacitors (16,19,20,27,28) and charging coils (21,29,30), column 3 lines 10-56. The gas laser also having a pair of discharge electrodes (11) and (12) [applicant's pair of electrodes], a gas medium within a pressure container (not shown) column 2 lines 62-68 and preionizers (22) and (23) [applicant's suitable means] for preionizing the laser gas, column 3 lines 57-61. Figure 1 illustrates a charging coil (21) [applicant's means to isolate] between capacitor (16) [applicant's sustainer pulse] and capacitors (19) and (20) [applicant's spiker]. Column 5 lines 12-28, discloses a delay [applicant's means to delay] in time between the

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preionization discharge [applicant's pre-ionising pulse] and the main discharge [applicant's spiker], which is provided by the preionization capacitors (22,28) having a smaller capacitance than the capacitors (19,20) of the main discharge capacitors, as illustrated in figure 2 (capacitors and inductors are equivalent both store energy). In column 7 lines 7-12, Furuya et al discloses applying the circuit of the invention to a TEA (Transverse excitation-atmospheric pressure) carbon dioxide (CO₂) laser.

Furuya et al is silent as to the TEA CO₂ laser gas having a mixture of CO₂, N₂ and, optionally, H₂.

However, TEA CO₂ are well known in the laser art to have a gas mixture of CO₂ and N₂, as described by Kyusho in column 3 lines 7-23, which discloses a TEA CO₂ laser having a mixture of CO₂, N₂ and He.

TEA CO₂ are also well known in the art to provide high power and short pulses, as described in column 1 lines 20-23 of Cirkel et al.

Furuya et al combined with the well-known teachings of Kyusho and Cirkel et al do not disclose a helium-free TEA CO₂ laser.

Leland et al teaches in column 3 lines 37-43, a high power laser having a gas mixture of CO₂, N₂ and helium-free to obtain nanosecond pulses (short pulses).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the gas mixture of Leland et al with the laser device of Furuya et al because it would provide more efficient short pulses without helium, as disclosed by Leland et al in column 3 lines 41-43.

Claim 7,

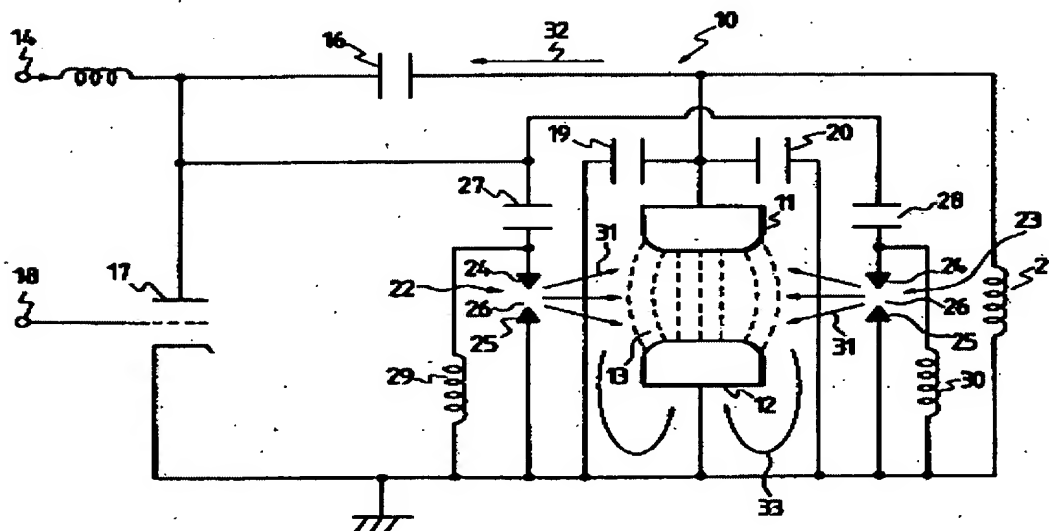
7. A helium-free TEA CO₂ laser according to claim 1 wherein said pair of electrodes is selected from profiled, cylindrical, or unprofiled electrodes with rounded off edges.

Regarding claim 7,

In figure 1 Furuya et al illustrates profiled electrodes (11) and (12) with rounded edges.

Figure 1 of Furuya et al

FIG. 1



Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (PN 5,293,390) in view of Kyusho (PN 4,802,185), Cirkel et al (PN 4,365,337) and

Leland et al (PN 4,264,868) as applied to claim 1 above, and further in view of Kosugi et al (PN 5,271,026).

Claim 2,

2. A helium-free TEA CO₂ laser according to claim 1 wherein said excitation circuit comprises single switch and single high voltage d-c source.

Regarding claim 2,

In figure 1 Furuya et al illustrates a switch (17) [applicant's single switch] and terminal (14) receiving high-voltage electric energy from a power supply, column 3 lines 10-17.

Furuya et al is silent as to having a single high voltage d-c source.

However, the use of DC high voltage power supply for gas lasers is well known in the art, as described by Kosugi et al in column 1 lines 32-45, where figure 15 is described as having a gas laser with a DC high voltage power supply. Figure 6 of Kosugi et al illustrates a gas laser having a DC high voltage power supply (7), as described in column 8 lines 7-15 and in column 19 lines 1-3 discloses the laser as a TEA (transversely excited atmospheric).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to provide the laser device of Furuya et al with a DC power supply as disclosed by Kosugi et al because it will provide high voltage electric energy.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (PN 5,293,390) in view of Kyusho (PN 4,802,185), Cirkel et al (PN 4,365,337) and

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Leland et al (PN 4,264,868) as applied to claim 1 above, and further in view of Taylor et al (PN 5,309,462).

Claim 8,

8. A helium-free TEA CO₂ laser according to claim 1 wherein said suitable means for preionising the said gas mixture in the inter-electrode volume comprises sparks produced between a plurality of preionising cylindrical metallic pins, positioned along the length of the said electrodes, one above the other with a uniform gap and located at an optimum distance on either or any one side of the said electrodes at regular intervals.

Regarding claim 8,

Furuya et al discloses in column 3 lines 38-45, preionizers (22) and (23) as having an array of spaced electrode pairs each having two electrode pins (24) and (25) [applicant's preionising cylindrical metallic pins] defining a gap (26) therebetween and being spaced along the main discharge electrodes (11) and (12) [applicant's any one side]. Column 4 lines 56-57 discloses, the electrode pins as being made of nickel.

Furuya et al is silent as to the geometry of the electrode pins, as being cylindrical metallic pins.

Taylor et al describes a circuit for an electric discharge gas laser having preionization electrodes and main electrodes, as illustrated in figure 2b and in column 8 lines 52-54 teaches different geometries for the preionization electrodes as cylindrical or planar, as illustrated in figure 7b.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to provide the laser device of Furuya et al with cylindrical or

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planar preionization electrodes because either shape or geometry of the electrode will provide preionization of the laser gas.

Furthermore, in accordance with MPEP 2144.04 IV B:

Changes in Shape

In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.).

In the instant application the geometry or shape of the electrodes is considered a design preference, since the shape of the electrode (cylindrical or planar) will provide preionization.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (PN 5,293,390) in view of Kyusho (PN 4,802,185), Cirkel et al (PN 4,365,337) and Leland et al (PN 4,264,868) as applied to claim 1 above, and further in view of Bragin et al (PN 6,546,036).

Claim 9,

9. A helium-free TEA CO₂ laser according to claim 1 wherein one of said pair of electrodes is semi transparent.

Regarding claim 9,

Furuya et al is silent as to one of said pair electrodes is semi transparent.

Bragin et al illustrates in figures 7, 10 and 11 a gas laser device having a pair of electrodes (101) and (102), where electrode (101) includes a slit/window/opening (107) through which UV radiation of corona discharge may pass (column 8 line 64 to column 9 line 1. In column 9 lines 22-25, discloses the slit/window/opening (107) as having a semi-transparent window [applicant's semi transparent electrode].

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the semi transparent electrode as taught by Bragin et al to the laser device of Furuya et al because it would prevent charged particles emanating from the main discharge area from settling on the housing and causing field distortion and discharge instabilities (Bragin et al column 3 lines 53-56).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya et al (PN 5,293,390) in view of Kyusho (PN 4,802,185), Cirkel et al (PN 4,365,337) and Leland et al (PN 4,264,868) as applied to claim 1 above, and further in view of Altman (PN 4,847,853).

Claim 11,

11. A helium-free TEA CO₂ laser according to claim 1 wherein the said inter-electrode volume is selected from 1cm³ to 200 cm³.

Regarding claim 11,

Furuya et al is silent as to the inter-electrode volume is selected from 1cm³ to 200 cm³.

Altman discloses in column 4 lines 46-47 and illustrates in figures 1 and 2, of typical dimensions for a TEA CO₂ laser having a lasant volume within the main discharge compartment (14) of approximately 65 mL, which converts to 65 cm³.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to provide the laser device of Furuya et al with the lasant gas volume disclosed by Altman because the lasant gas volume is a typical well-known dimension for TEA lasers to provide laser beam generation.

Allowable Subject Matter

Claims 3-6 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3,

None of the cited prior arts alone or in combination discloses the claimed helium-free TEA CO₂ laser having the recited limitations of dependent claim 3 along with the base and all intervening claims and having in particular the structural arrangement of a wire wound inductance connected between ground and the electrode to provide both a means to isolate and a means to delay.

Regarding claims 4, 5 and 6,

None of the cited prior arts alone or in combination discloses the claimed helium-free TEA CO₂ laser having the recited limitations of dependent claim 4 along with the

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base and all intervening claims and having in particular a means to vary the peak power, duration and energy of laser pulse.

Regarding claim 10,

None of the cited prior arts alone or in combination discloses the claimed helium-free TEA CO₂ laser having the recited limitations of dependent claim 10 along with the base and all intervening claims and having in particular the structural arrangement of a semi transparent electrode and a plurality of uniformly spaced preionising cylindrical metallic pins, positioned beneath and along the length of the semi transparent electrode providing sparks for preionising the gas mixture.

Claim 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ARMANDO RODRIGUEZ whose telephone number is 571-272-1952. The examiner can normally be reached on 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


ARMANDO RODRIGUEZ
Examiner
Art Unit 2828

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